

A.1.2 ASTROPHYSICS DATA ANALYSIS

1. Scope of Program

This NRA solicits proposals to the Astrophysics Data Program (ADP) for research involving NASA space astrophysics data that are currently archived in the public domain and for the analysis of new observations awarded through competitive peer review and obtained by the RXTE and BeppoSAX satellites. Abstracts of currently funded ADP projects can be found online at <http://spacescience.nasa.gov/> (select "Research Solicitations," then "Past/Archive Solicitations and Selections").

There are three defined types of proposals that may be submitted to this program: Type A, Type B, and Type C. All proposals will compete together in the same science panels regardless of Type.

The period of performance for Type A and Type C proposals is up to three years. The period of performance for Type B proposals for data reduction and analysis of only new observations is one year, whereas Type B proposals that also include the analysis of relevant public-domain archival data may request periods of performance of up to three years.

- *Type A: Proposals for the Analysis of Archival Data*

Type A proposals are defined as those whose dominant emphasis is the analysis and interpretation of NASA space astrophysics data that are archived in the public domain at the time of proposal submission. Most of these data have undergone considerable reduction and refinement by way of calibrations and ordering, and extensive data analysis software tools often exist for these data. The following space astrophysics missions are a representative, but not complete, alphabetical list of missions that have such mature data archives (note that, for the purpose of this program, the 2MASS data archive is considered NASA space astrophysics data):

- Advanced Satellite for Cosmology and Astrophysics (ASCA)
- Astro Shuttle Experiments [the Hopkins Ultraviolet Telescope (HUT), the Wisconsin Ultraviolet Photopolarimetry Experiment (WUPPE), the Ultraviolet Imaging Telescope (UIT), and the Broad-Band X-Ray Telescope (BBXRT)]
- Beppo Satellite di Astronomia X (BeppoSAX)
- Compton Gamma-Ray Observatory (CGRO)
- Cosmic Background Explorer (COBE)
- European X-Ray Astronomy Satellite (EXOSAT)
- Extreme Ultraviolet Explorer (EUVE)
- Far Ultraviolet Spectroscopic Explorer (FUSE)
- Ginga
- High Energy Astronomy Observatories (HEAO-1, 2, and 3)
- High Energy Transient Explorer 2 (HETE-2)
- Infrared Astronomical Satellite (IRAS)

- Infrared Space Observatory (ISO)
- International Ultraviolet Explorer (IUE)
- Midcourse Space Experiment (MSX)
- ORFEUS-SPAS I and II
- Roentgen Satellite (ROSAT)
- Rossi X-ray Timing Explorer (RXTE)
- Two Micron All Sky Survey (2MASS)
- Submillimeter Wave Astronomical Satellite (SWAS)
- Ulysses (Galactic Cosmic Ray and Gamma Ray data)
- Voyager Ultraviolet Spectrometer (UVS)
- X-ray Multi-Mirror-Newton (XMM-Newton).

Most NASA space astrophysics data may be found in one or more of the NASA astrophysics data centers. NASA astrophysics data centers include:

- Astrophysics Data System (ADS) (<http://adswww.harvard.edu/>)
- High Energy Astrophysics Science and Analysis Data Center (HEASARC) (<http://heasarc.gsfc.nasa.gov/>)
- Infrared Science Archive (IRSA) (<http://irsa.ipac.caltech.edu/>)
- Multimission Archive at Space Telescope (MAST) (<http://archive.stsci.edu/>)
- NASA/IPAC Extragalactic Database (NED) (<http://nedwww.ipac.caltech.edu/>)
- National Space Science Data Center (NSSDC) (<http://nssdc.gsfc.nasa.gov/astro/>).

Note that proposals for archival research using data from the Hubble Space Telescope (HST) and the Chandra X-Ray Observatory (CXO) are solicited through separate announcements and should not be submitted in response to this solicitation.

• *Type B: Proposals for the Analysis of New Data to be Taken through Recently Awarded Observing Time*

Type B proposals are those that seek funding support for data reduction and analysis of the data to be taken through observing time that has already been awarded through competitive peer review for the current observing cycles of RXTE (Cycle 7) or BeppoSAX (Cycle 6). In addition, Type B Proposals may supplement the primary RXTE/BeppoSAX data reduction and analysis of new observations with data analysis of relevant public-domain, archival data from these as well as other space astrophysics missions. Although Type B Proposals may contain the text originally submitted to RXTE or BeppoSAX solicitations for observing time, the proposal to ADP should not be that for only an observing proposal.

Type B proposals may also be submitted for support of approved RXTE Cycle 7 Targets of Opportunity (TOO's). If selected, however, funding of such "conditional awards" will not be initiated until after the observation(s) have been completed.

- *Type C: Proposals for the Analysis of Archival Data Requiring the Development of Information Technology Tools*

Type C proposals are those for the analysis of archival data that require the development of new Information Technology (IT) tools that hold the promise of use and application by other researchers. The primary emphasis of a proposal of this type must be a science investigation requiring the analysis and interpretation of substantial NASA space astrophysics data that are archived in the public domain at the time of proposal submission. Proposals of this type must require the development of a new data analysis, data mining, data archiving, or other IT tool that can be applied more generally than the proposed science investigation. Proposals of this type that make use of data archives from more than one of the NASA astrophysics data centers (see below) are especially encouraged. Proposals to develop tools that substantially duplicate existing tools are not solicited.

Proposals of this type are required, as part of the funded activity, to make the developed IT tool publicly available through a NASA astrophysics data center (see list below). Therefore, selected investigators are expected to work directly with an appropriate NASA data center in developing, using, and archiving their IT tools, as well as any high-order data products that are developed in the course of the science investigation. The proposal must describe the plan for archiving the new IT tool.

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- High Energy Astrophysics Science and Analysis Data Center (HEASARC) (<http://heasarc.gsfc.nasa.gov/>)
- Infrared Science Archive (IRSA) (<http://irsa.ipac.caltech.edu/>)
- Multimission Archive at Space Telescope (MAST) (<http://archive.stsci.edu/>)
- NASA/IPAC Extragalactic Database (NED) (<http://nedwww.ipac.caltech.edu/>)
- National Space Science Data Center (NSSDC) (<http://nssdc.gsfc.nasa.gov/astro/>).

General Requirements

In support of any of these three types of ADP proposals, but as a secondary emphasis and only as needed to interpret the data, the proposed research may include theoretical research or numerical modeling, use of existing data from ground-based or suborbital observations, and/or laboratory astrophysics measurements. In addition, NASA will consider requests for support for new ground-based observations provided that the requests are clearly described, the observations are important to the success of the proposed ADP effort, and their expense (including salary, travel, etc.) constitutes no more than ten percent of the proposal's total budget.

Proposers to this NRA should note that the ADP is not intended to support:

- investigations whose primary emphasis is theoretical research, numerical modeling, laboratory astrophysics measurements, or detector development, since there exist other NASA programs that support these research activities;
- investigations whose primary focus is on solar system objects or on the solar-terrestrial interaction, since other NASA programs support this kind of research;
- proposals primarily for the education and training of students;
- proposals for the organizing and/or hosting of scientific meetings; or
- proposals for the acquisition of substantial computing facilities or resources beyond nominal workstation or network requests.

Prospective submitters should also be aware that considerable research has already been done using these archival data sets by the original mission science teams, as well as by previously selected participants in the ADP. Therefore, proposals must demonstrate how the proposed research clearly extends the frontier of existing knowledge in a fundamental and important manner rather than merely repeating a type of analysis on heretofore unstudied objects of some class or type. If a new proposal for this program element is itself based on a previously funded research effort, the proposal must identify that work and clearly summarize all significant results from it.

2. Proposal Type, Data Sets, and Research Area

Each ADP proposal must be identified as Type A, Type B, or Type C by checking the appropriate box on the *Cover Page* (see the "*NASA Guidebook –for Proposers*"). For all Types of proposals, the *Cover Page* also provides for designation of the data sets proposed for analysis and also of the Research Area, as defined below, that designates the primary focus of the proposal. Identification of the appropriate Research Area facilitates the assignment of each proposal, regardless of Type, to the appropriate review panel. Note that each proposal, regardless of Type, must identify one primary Research Area (a secondary Research Area may be designated, if necessary). In any case, NASA reserves the right to reassign a proposal to a different primary or secondary Research Area. The ten defined Research Areas are:

1. *Solar System, including the Sun* (Note: proposals whose primary focus is solar system research using the IRAS Asteroid and Comet Survey or Voyager data should be submitted to other NRA's or other program elements in this NRA that are relevant to those objectives; for ADP the only acceptable solar observations are those of high-energy spectral and temporal studies of solar flares utilizing CGRO data);
2. *Star Formation and Pre-Main Sequence Stars* (including star-forming clouds, protoplanetary and debris disks, protostars, and T Tauri stars);
3. *Main Sequence Stars*;
4. *Post-Main Sequence Stars and Collapsed Objects* (including giants, isolated white dwarfs, isolated neutron stars, central stars of planetary nebulae, and gamma-ray bursts);

5. *Binary Systems* (including cataclysmic variables, x-ray binaries, and black hole binaries);
6. *Interstellar Medium and Galactic Structure* (including supernova remnants, dark clouds, interstellar dust, H II regions, diffuse galactic emission, and planetary nebulae);
7. *Normal Galaxies*;
8. *Active Galaxies and Quasars* (including interacting galaxies, starburst galaxies, Seyfert galaxies, radio galaxies, AGN's, and quasars);
9. *Large Scale Cosmic Structures* (including clusters of galaxies, galaxy environment and evolution, intracluster medium, diffuse x-ray background, and cosmology);
10. *Gravitational Astrophysics and Fundamental Physics* (including gravitational wave astronomy and space tests of the fundamental laws of physics such as relativity).

3. Programmatic Information

It is anticipated that approximately \$2.0M will be available through this Announcement for the funding of new awards for the Astrophysics Data Program to fund proposals of a maximum of three years duration. The average level of support per year is expected to be in the range of \$50K.

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (OSS) is now using a single, unified set of instructions for the submission of proposals. This material is contained in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement – 2001* (or *NASA Guidebook for Proposers* for short) that is accessible by opening URL <http://research.hq.nasa.gov>, and linking through the menu item "Helpful References," or may be directly accessed online at URL <http://www.hq.nasa.gov/office/procurement/nraguidebook/>. This NRA's Summary of Solicitation also contains the schedule and instructions for the electronic submission of a *Notice of Intent* (NOI) to propose and a proposal's *Cover Page/Proposal Summary*, which now also includes the required *Budget Summary*, and the mailing address for the submission of a proposal.

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